Digital Poster Creation:

Basic Design Concepts and Tools

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Workshop Overview

- Poster Elements:
  - Written content
  - Charts
  - Graphics
- Design Principles

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Before you begin . . .

Ask:

1. What are the most interesting or valuable findings from your research?
2. What is visually interesting about your research?
3. How will your presentation of the poster add interest?

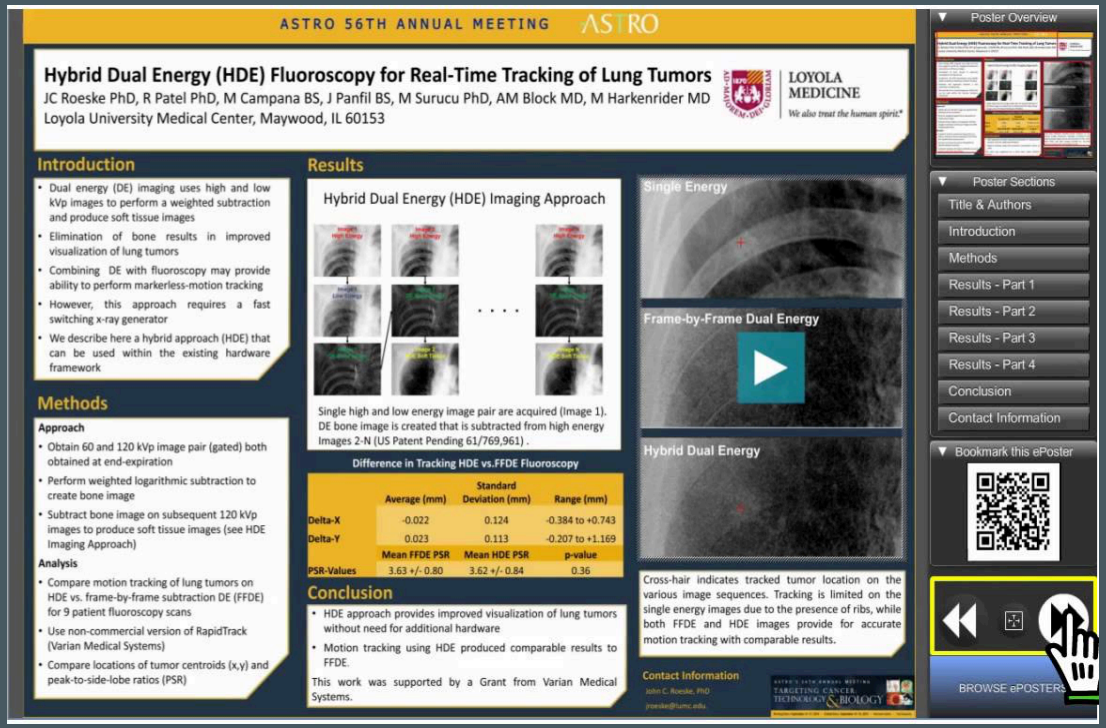
Poster Elements

Visual content:

- Charts
- Graphics
- *Multimedia

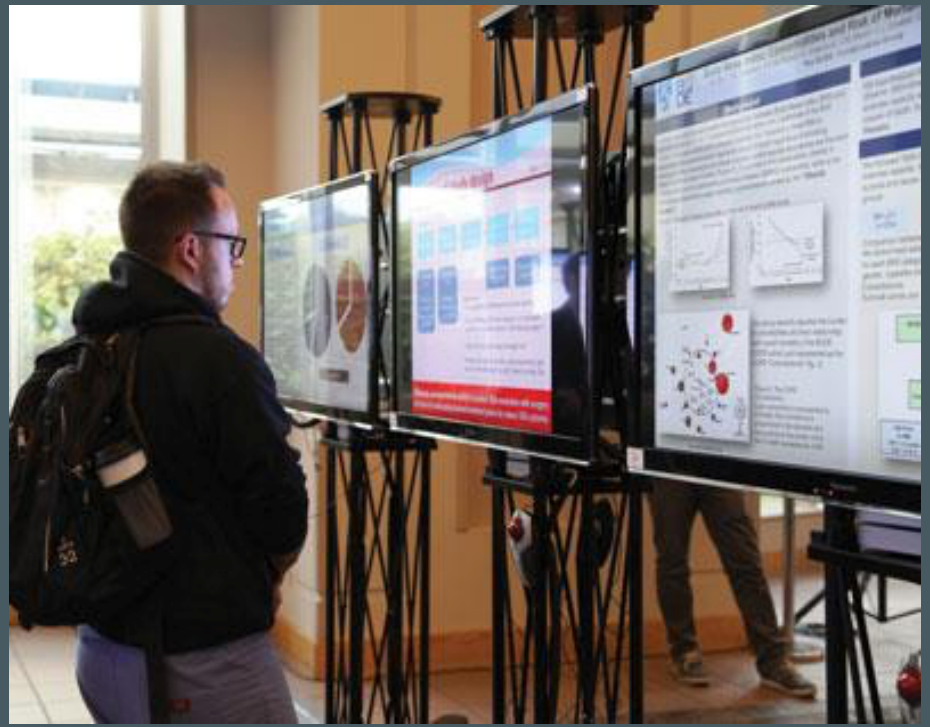
Written content:

- Text



Consider the Digital Design Space

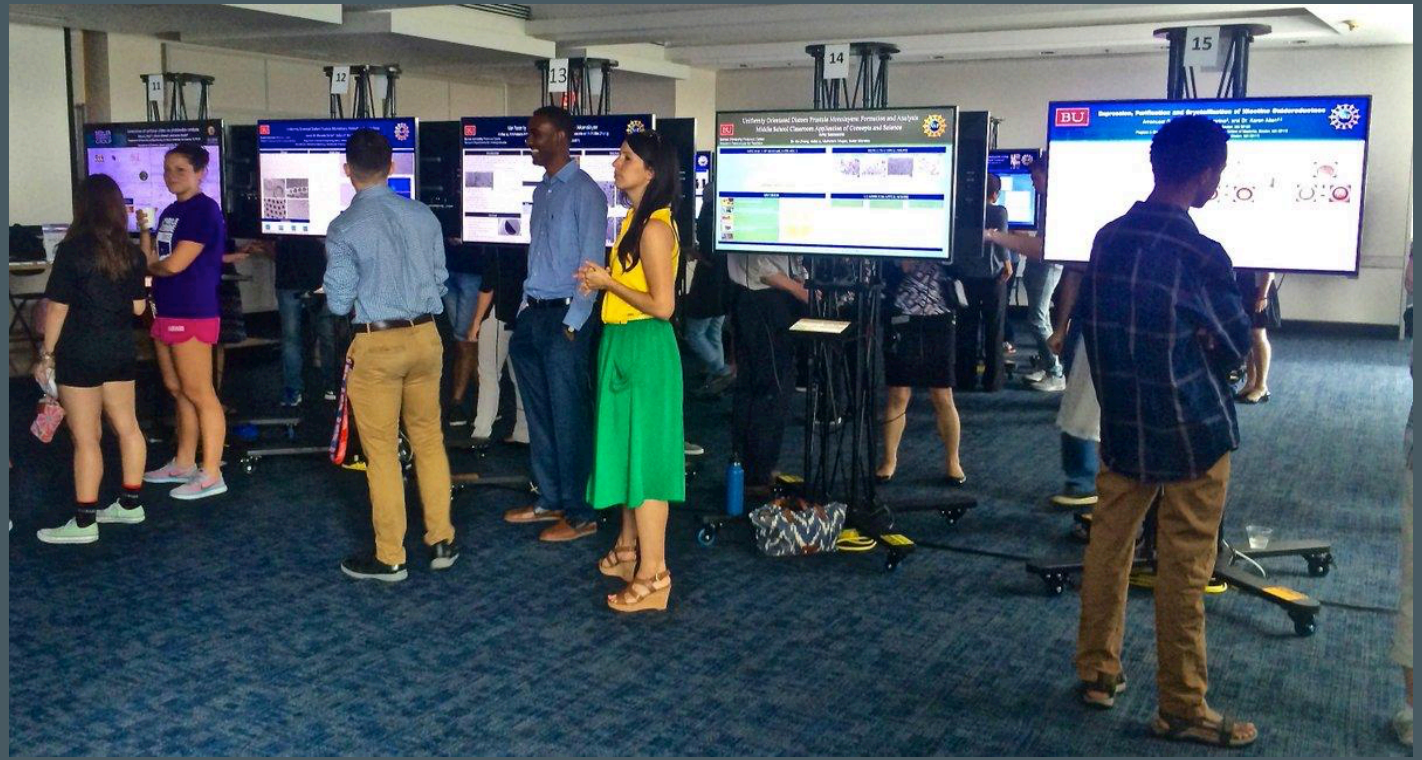
- Dynamic or static
- Readability is slower
- Contrast important
- Screen size
- Short lines and paragraphs
- Avoid clutter



Source: *BWH Bulletin*, June 7, 2013

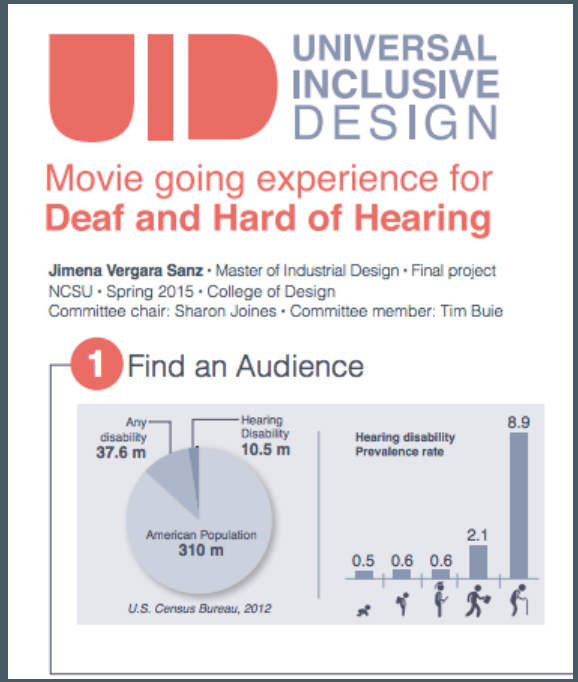
Example digital poster session

Source: Twitter



Charts

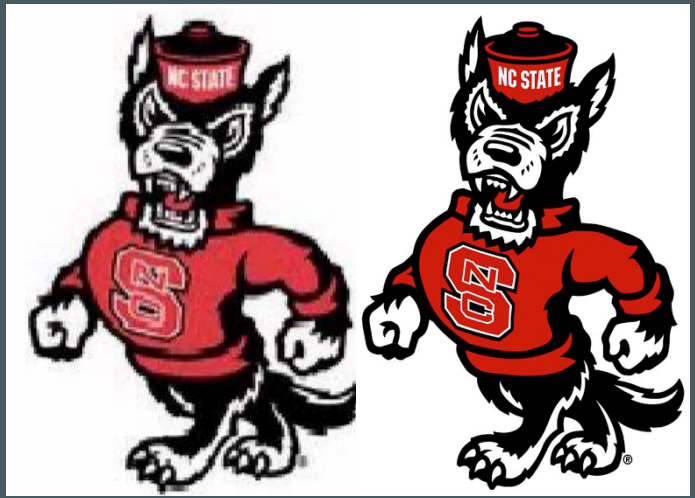
- Fonts should be readable from a distance
- Concise captions
- Annotation
- Labeled data points
- Consider light background color alternatives to white



Graphics

- Good ratio of graphics to text
- Avoid clip art. Use high definition graphics and images.

Google has advanced search tools to help with finding HD images



Written Content

- Short & concise (300-400 words)
- Limit the use of different font types (2)
- Recommended fonts:
  - Times New Roman
  - Calibri or Arial

Text

Readable from 3 feet away

Title (85 pt)

Headers (44 pt)

Body (28 pt or higher)

Text

Title:

At the top with author information (name, position, affiliation)

Common Headings (usually the same as a printed poster):

Abstract
Background
Introduction
Methods
Results
Conclusions
Acknowledgements/References

Design Principles

Effect of Microbial Legacy on Nitrogen Cycle and Restoration Success

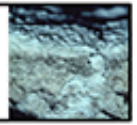
[redacted]
University of Texas at Austin

Introduction

•Nitrogen(N) cycle plays a key role in ecosystem and every transformation of the N cycle driven by microbes.
•Restoration attempts on converting abandon rangelands in south Florida back to the native scrub ecosystems allow a unique opportunity to study persistent effects of previous vegetation left on the microbial community and ecological processes.
•Biological crust is essential for native ecosystem.

What is Crust?

•A surface layer of "Living Soil", consisting primarily of cyanobacteria, algae, fungi and their byproducts.
•Supports many biological functions like N fixation and water infiltration control.



Questions

•How does native crust affect microbial legacy?

•Which impacts the N-cycle more? Microbial abundance or composition?

Field Site: Native scrub lands and abandoned pastures at Archbold Biological Station.

•Sites are abandoned pastures and native scrub lands subjected to pasture removal treatments and crust addition treatment(Fig.2).

Fig 1. Archbold Biological Station is located at the southern end of the Lake Wales Ridge in central FL.

Fig. 2 Plot design

Heavily pastured

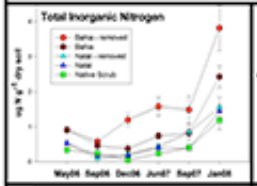
Lightly pastured

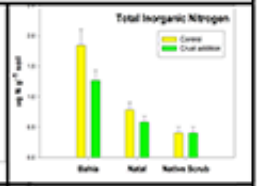
Native scrub

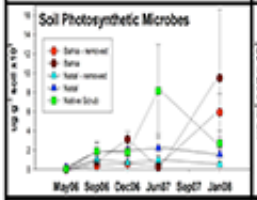
Method

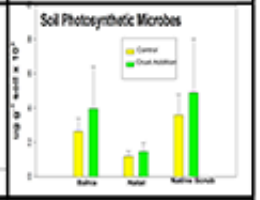
•Biogeohemical
  •KCl extraction
  •Photosynthetic activity determine by fluorometry.
•Molecular approach
  •PCR
  •RFLP
  •Direct sequence analysis

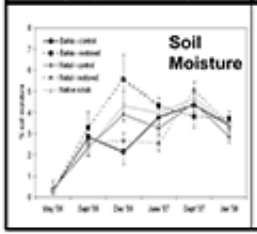
Soil Nitrogen, Photosynthetic Microbes Abundance, and Moisture changes over time and treatment











•Crust addition decrease inorganic N, but does not affect microbial abundance.
•Native soil respond and tracks moisture.
•Inorganic N is not tracked by any site.
•Pastures site response to moisture unknown.

Possible mechanisms

•Pasture vegetation has caused a shift in soil microbe community and chemistry.

•Frequent disturbance favor more resilient microbes and changes community composition.

Sample restriction fingerprint

•DNA based fingerprints allow characterization of community difference.
•Couple with clone library will allow identification of species.

Conclusion

• Inorganic nitrogen increases over time, and pasture sites both have higher inorganic nitrogen than the native.

•Crust treatment helps increase nitrogen fixation, but does not increase microbial abundance significantly.

•The microbial abundance does not track N, but does track moisture.

•Composition may be the more important factor in N-cycling.

Acknowledgment

•This project was supported by the National Research Initiative of the USDA Cooperative State Research, Education, and Extension Service, National Science Foundation and the Department of Defense.

•Special thanks to all members of the Hawkes lab, Juenger lab,and Manges Lab.

INSERT YOUR POSTER TITLE ON THESE LINES HERE

Name of Author

Department Name and Institution Name can go here

BACKGROUND

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MATERIALS AND METHODS

Title One

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Title Two

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Title Three

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RESULTS

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PURPOSE

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CONCLUSIONS

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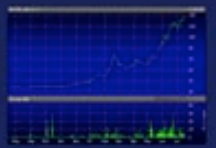

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REFERENCES

1. Reference here
2. Second reference
3. Third reference

Space in the Workplace: How Perspective and Valence of Anticipated Information Matter

Teenie Matlock & Justin L. Matthews • Cognitive and Information Sciences • University of California, Merced

tmatlock@ucmerced.edu • jmatthews@ucmerced.edu • graduatestudent.ucmerced.edu/jmatthews

Question

Can varying narrative perspectives differentially influence virtual agent placement in a simulated work environment?

Background

- Virtual Environments (VE) are popular; over 1 million people used Second Life during any given month in 2010.[1]
- Interpersonal distance effects are witnessed in both real life and in VE.[2]
- In VE, sitting closer to a speaker leads to increased persuasive power of the speaker.[3]
- Virtual character agreement has an underlying spatial component, where increased physical distance is associated with decreased shared attitude.[4]

- This work addresses the relationship between expected character interaction and agent placement in a simulated work environment.

Experiment

- Participants read about salary adjustments at a fictitious company (see Narrative).
- They then imagined being employed at the company while viewing a virtual office environment (see Visual Stimuli).
- Finally they drew an "X" to show where they would place a chair during a meeting related to salary adjustments.

Figure 1

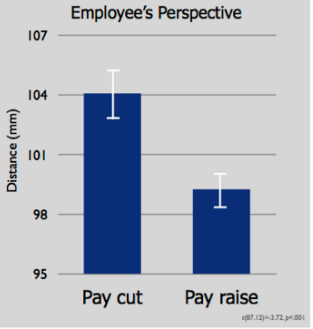
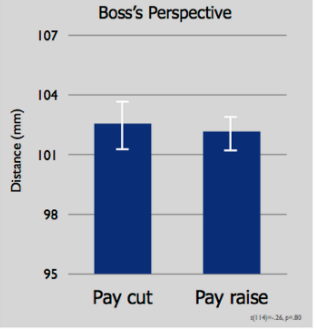


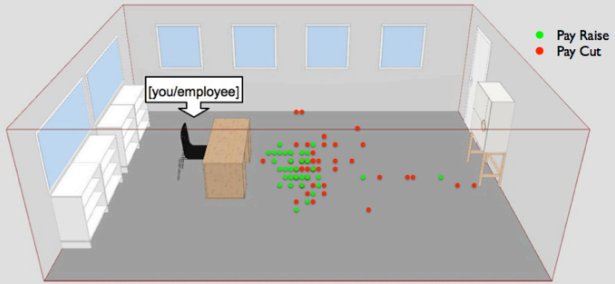
Figure 2



Narratives & Visual Stimuli

Imagine that you work for an advertising company.
Your manager has scheduled a meeting with you for later today.
Some co-workers recently received a pay [cut/raise] and you suspect that you are next.
Note that managers must take along their own chairs when they talk to their employees

Imagine that you are a manager for an advertising company.
You have scheduled a meeting with one of your employees later today.
In the meeting you will tell the employee that he will receive a pay [cut/raise].
Note that managers must take along their own chairs when they talk to their employees.



Please draw an "X" to show where your manager will place their chair in your meeting about receiving a pay [cut/raise].

Please draw an "X" to show where you will place your chair in the meeting about giving your employee a pay [cut/raise].

Results

- Agent placement reliably differed by both agent perspective and anticipated meeting topic, $F(1,211)=4.69$, $p=.03$.
- Participants placed virtual agents reliably closer to their boss's agent when expecting to discuss a pay raise ($M=99.26$, $SD=5.32$), and farther away when expecting to discuss a pay cut ($M=104.08$, $SD=7.39$) (see Figure 1).
- No inter-agent differences were found when readers took the Boss's perspective (see Figure 2).

Conclusion

- These results suggest that agent viewpoint is important in virtual environments when considering where to place an agent.
- Results suggest a link between perceived virtual character agreement and spatial distance.
- This link seems to take the form of a negative relationship, where greater "distance" in shared attitude is associated with increased physical distance.
- The results have implications for the design and use of applications for virtual meetings and more generally, social interactions in virtual environments.

References

1. Data file of Logged-in Users in Second Life. Accessed at http://secondlife.com/statistics/economy-data.php on April 1, 2010.
2. Blascovich, J., Loomis, J., Beall, A.C., Swinth, K.R., Hoyt, C.L., & Bailenson, J.N. (2002). Immersive virtual environment technology as a methodological tool for social psychology. Psychological Inquiry, 13, 103-124.
3. McCall, C., Blascovich, J., Young, A., & Persky, S. (2009). Proximal virtual agents and the eye gaze hypothesis. Personality and Social Psychology Bulletin, 35, 1-13.
4. Matthews, J.L. & Matlock, T. (2010). Understanding the effects of space on the formation of cross-group relationships. Proceedings of the 32nd Annual Conference of the Cognitive Science Society. Portland, OR.

A Compartment Model for the Transport and Storage of Folate

Mentor: Dr. H. Frederik Nijhout Biology Department, Duke University
Tiffany J. Chen

Objectives:

- To estimate the average pool sizes of folate distributed within the plasma, the cell, and the mitochondria.
- To develop mathematical models that represent these pool sizes and mimic real bodily responses to day-to-day changes in diet and metabolism.
- To test these models against experimental data, as well as make predictions.

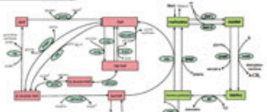


Figure 1.

Background:

Folate, or vitamin B9, is important for the synthesis of thymidine, a pyrimidine, and purines. Deficiency in folate is associated with megaloblastic anemia, cancer, cardiovascular disease, neurological disorders, and neural tube defects in infants. Folate metabolism provides the rate-limiting step for DNA synthesis and DNA and histone methylation (Fig. 1). Reduced folate status affects these critical cellular activities and also increases the level of homocysteine, a highly reactive amino acid that is associated with cell damage. It has been shown that increased folate intake by pregnant women can help reduce the risk of infant neural tube defects, presumably due to a reduction in plasma homocysteine levels. Folate metabolism occurs within cells, but their levels are typically measured in the plasma. It is therefore critical to understand the relationship between the concentrations of folate in the plasma and the cell.

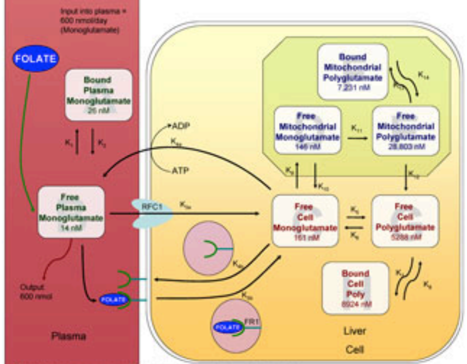


Figure 2. Estimated pool concentrations of folate in the plasma and in the liver cell. Ks represent rates of molecule transport and binding.

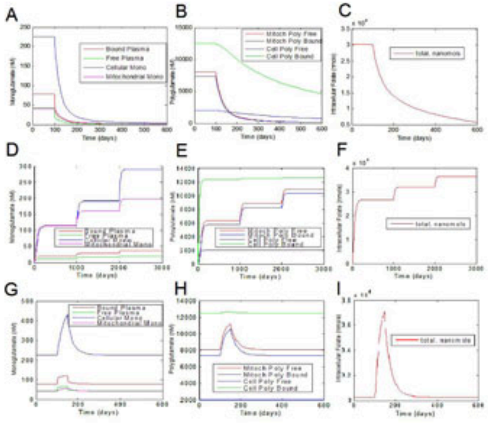


Figure 3

Methods:

Various pool values for plasma and intracellular folate were collected from experimental data (Figure 2). We made predictions for pool values that are not readily available. These predictions were based on known distribution of the various folate pools within the body. For example, 50% of body folate is stored in the liver – the liver contains 2 compartments. These are the cytosol and the mitochondria, each containing three general pools, monoglutamate, free polyglutamate, and bound polyglutamate. These individual pools have different proportions in the cytosol and the mitochondria.

After pool values were established, we assumed that transport of molecules between pools were based on first-order mass-action kinetics. We used Michaelis-Menten equations for the bound polyglutamate pools, because there is a limited amount of protein that will bind to folate – mainly glycine N-methyltransferase (GNMT), one of the enzymes in the methionine cycle (Fig. 1). In addition, we used Michaelis-Menten kinetics for the transport of folates in and out of the cell via Reduced Folate Carrier 1 (RFC1), Folate Receptor 1 (FR1), and an ATP-dependent exporter (Fig. 2).

Rate constants, or k-values, were calculated by assuming certain fluxes between pools. These fluxes were determined by known rates of gain and loss of folate in different compartments where these rates were known, and by adjusting the relative rates of input and output to obtain the right pool sizes between compartments in cases where the absolute rates were not known.

Experiments were performed by varying folate input. These were performed to determine half-lives of the pools, as well as to determine how the pools reacted to example experimental conditions from the literature.

Results:

1. The Model

The model correctly simulates the sizes of the folate pools in the various compartments, including the cytosol, the mitochondria and the fractions bound to proteins in those compartments.

2. Predicted half-life of folate.

After we removed the constant input of folate into the system, all pools diminished over time, some more quickly than others (Figures 3A, 3B). We can also see in figure 3C that the approximate half-life for total intracellular folate is 80 days, which is close to predicted values of around 80-100. Bound polyglutamate seems to decrease at a much slower rate than the other pools.

3. Reaching steady-state values.

The time for the total intracellular pools to reach steady-state typically ranged from 300 to 500 days, which corresponds well with data from the literature. Consistent with the idea that there is a correlation between intracellular folate pool size, polyglutamation, and protein binding, all types of polyglutamate pools do in fact take longer to reach a steady-state value (Figures 3D, 3E).

4. Response to pulsed folate input.

The input of folate was increased to 1000 nmol/day for 50 days. Model plasma levels were quick to rise and fall with the sudden changes, which predicts that free as well as loosely bound monoglutamates will react quickly to changes in folate intake (Fig. 3G). Out of the polyglutamate pools, the model predicts that both bound pools will take longer to return to steady-state, although the mitochondrial bound polyglutamate will take the longest of all of the pools (Fig. 3H).

Conclusions:

We have constructed a mathematical compartment model for folate that takes into account the different methods of transport, as well as retention in the plasma, cell, and mitochondria. We have compared the output of this model with results from current experiments, and have found that the model accurately simulates data from the literature. This model will for the foundation for future studies on the metabolism, transport and sequestration of folates under various genetic and environmental conditions.

Many thanks to Dr. H.F. Nijhout for his guidance and his patience, as well to both Dr. Nijhout and Dr. M.C. Reed for the use of their folate and methionine cycle programs and diagrams. Initial research was supported (in part) by a Howard Hughes Summer Research Fellowship.

A Novel Method to Quantify Levels of Macrosteatosis in Histology Images of the Liver

Srivathsan Babu Prabu[1], Alvin I. Chen[1,2], Francois Bethiaume[1], Timothy J. Maguire[1,2], Nir I. Nativ[1], Martin L. Yarmush[1,2]

[1]Department of Biomedical Engineering, Rutgers University, Piscataway, NJ

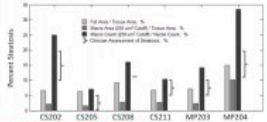
[2]Center for Innovative Ventures of Emerging Technologies

Abstract

Orthotopic liver transplantation is a highly successful therapy for the treatment of both acute and chronic liver failure, but is limited by donor scarcity. Macrosteatosis is one of the most common causes of exclusion from the donor pool, being that such livers are more sensitive to ischemia/ reperfusion (I/R) injury inherent to liver procurement, storage, and transplantation. This in turn leads to increased rates of primary non-function, as well as increased morbidity and mortality. Therefore, it is crucial to accurately determine the macrosteatosis percentage within a liver graft prior to transplantation. The current gold standard of assessing the pathological state of liver tissue is based on the pathologist's naked eye analysis. Previous studies have demonstrated that this subjective analysis lacks precision, reproducibility and may overlook various features and trends in the tissue steatosis state, such as total surface area of fat droplets which may represent the total triglycerides stored as fat vacuoles in the tissue. **Here, we demonstrate the ability of a novel, automated image analysis software to yield fast, precise, and reproducible analysis of the tissue pathological steatosis state.** The software segments and quantifies micro and macrosteatosis from an array of steatosis relevant image-based signatures, and can serve as an essential tool for pathologists and transplant surgeons to assess the suitability of pre-transplantation donor livers using an accurate unbiased metric. This may allow for the successful transplantation of livers that would have been otherwise discarded based on the current, imprecise steatosis criteria for transplantation. [1]

Significance and Motivation

- About 1,000 livers offered for orthotropic transplantation are discarded yearly due to abnormally high hepatic intracellular triglyceride level content, known as steatosis, which increases likelihood of morbidity and mortality post-transplantation. [1]
- Two types of steatosis:
  - **Microsteatosis** – Characterized by small fat droplets and clinically irrelevant.
  - **Macrosteatosis** – Triggered by large fat droplets and primarily contributes to graft non-function following transplantation. [2]
- Therefore, it is not only critical to accurately determine steatosis percentage, but also distinguish between macrosteatosis from microsteatosis in a liver graft prior to transplantation. [3]
- **Current methods of measuring steatosis:**
  1. Fat area / tissue area (%) underestimates steatosis
  2. Macro area / tissue area (%) underestimates steatosis
  3. Macro count (250um²) / nuclei count (%) overestimates steatosis
  4. Fat count / nuclei count (%) significantly overestimates steatosis (not shown) [4, 5]



- **Need objective differentiation between micro and macrosteatosis!**

Novel Contributions

- A fully automated, un-biased, image analysis software that:
  1. Accurately differentiates micro and macrosteatosis through a novel and robust metric combining (1) lipid droplet cross-sectional surface area, and (2) the proximity of the lipid droplet's edge to nearest adjacent nuclei.
  2. Is in agreement with the pathologist's assessment of macrosteatosis – a key feature that has not been demonstrated in any previous work seeking to determine steatosis level pre-transplantation.

Iterative Active Contour Segmentation

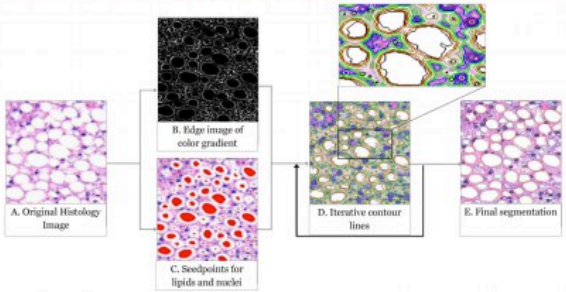


Figure 1. **Figure 1A** shows a sample histology image. As shown in **Figure 1B**, an edge function is first discerned from the color gradient of the image. **Figure 1C** shows the region-growing routine initialized with light and dark intensity seedpoints, which correspond to potential steatotic droplets and nuclei, respectively. In **Figure 1D**, active contour is applied to refine the segmentation by parameterization and comparison against an idealized lipid and nuclei model. A voting process is implemented, where the candidate region's new score is compared to its score at the previous iteration, and the better representation is stored while the other is discarded. **Figure 1E** gives the final segmentation image, which is simply the summation of all the winners for each object class.

Classification of Fat Droplets and Sinusoidal Space

Sphericity = 2π (Equivalent Radius) / Perimeter

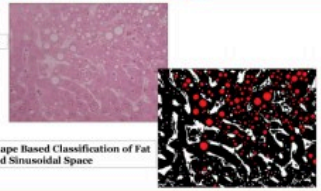
Convexity = Area / Convex Area

Compactness = Perimeter² / 4π Area

Aspect Ratio = Minority Axis Length / Majority Axis Length

Final score = a_1 (*Sphericity*) + a_2 (*Convexity*) + a_3 (*Compactness*) + a_4 (*Aspect Ratio*)

where a_i $(i = 1...4)$ determined by visual inspection



Nuclei Proximity Measure

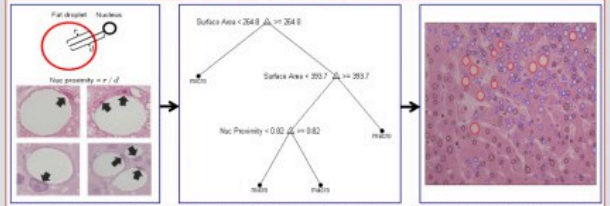


Figure 2. Nuclei proximity is leveraged to accurately distinguish micro and macro for the "gray area" of droplets having surface area between 291.5 and 355.2 um². A decision tree was constructed and optimized to serve as an automated classifier of micro and macrosteatosis based on droplet radius and nuclei proximity.

Results

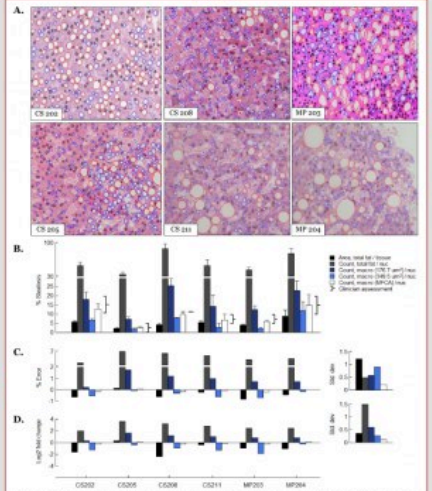


Figure 3. Comparing different estimates of steatosis to clinician assessment on six patients. **Figure 3A** highlights segmentation of macrosteatotic droplets in histology slides on six patients using our method. **Figure 3B** compares different schemes of quantifying steatosis with standard deviations for these six patients. **Figure 3C** and **3D** give the percent error and Log-2 fold-change for each method, respectively. These measures convey the error of the computerized estimate relative to the clinical standard. Standard deviations of the errors **(right)** indicate the consistencies of the estimations errors.

Future Work

In upcoming studies, we seek to:

- Build a complete training set from a multi-center study to refine the classifier.
- Perform a triglyceride assay to validate the software against an objective determinant of lipid content (as opposed to the subjective clinician assessment).
- Conduct outcome studies to measure the true effects of steatosis state on liver donor transplantation success.

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THE STUDY ON RELATIONSHIP OF FEEDING BEHAVIOUR AND COGNITIVE ABILITY OF MANTA RAYS

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S.E.A. Aquarium

INTRODUCTION

Figure 1: Ladle feeding session at the manta ray's feeding point

Figure 2: Syringe feeding during interaction session

The objectives are to document manta ray behavioral adaptation during various feeding mechanism and discover new information to be provided for new or existing aquariums to create or improve overall husbandry practices.

Manta rays possess the largest brain-body ratio among all fishes.Among the other large-bodied plankton filter feeders such as whale and basking sharks, the brain to body weight ratio of manta rays is the highest (Striedter, 2005; Ari, 2011).Manta cognitive studies in the wild are hard because of their mobility and widespread movement thus making use of captivity as a suitable alternative to study them (Sakai, Hishii &Kohshima, 2007).

MATERIALS AND METHODS

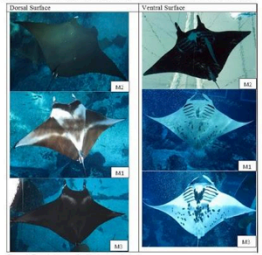


Figure 3: The trio Manta alfredi in the aquarium

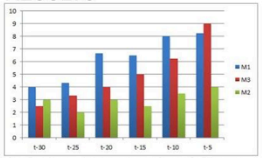
Figure 4: The three manta rays gathering after interaction syringe feeding session

Figure 4: M1 passing M2 feeding spot

M2 feeding point (M2fp)	M1 and M3 must cross the sea trek area. M2 must cross sea trek area or dome to be recorded as visitation. The direction of crossing dome must be from holding area to M1 feeding point.
M1 feeding point (M1fp)	M1 and M3 must be less than 1 meter deep below surface and 2 meter away from the feeding point. M2 must be less than 3 meters deep but 2 meters away from sidewalk.
M3 feeding point (M3fp)	M1 and M3 must be less than 2 meters deep below surface and 3 meters away from the feeding point. M2 must be less than 3 meters deep but 2 meters away from sidewalk.
Diver entry	M2 must pass through the border between the sea trek area and dome. M1 and M3 must touch the dive entry wall.

Table 1: Criteria for pathways taken by the manta rays 30 minutes before feeding time

RESULTS



Chat 1: Trend of frequency of visitation by each manta to Diver entry/ Sea Trek area over 30 minutes before Interaction syringe feeding session

Figure 5: M1 sommerauting over the stream of bubbles released by the breathing apparatus by divers

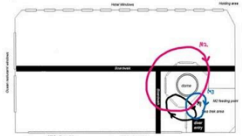


Figure 5: Pathways taken by the manta rays before interaction syringe feeding session

Figure 7: M2 charging towards the trainer during interaction syringe feeding

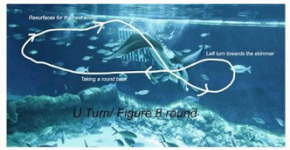


Figure 6: M1 taking U-turn round at its own feeding point during ladle feeding session

CONCLUSION

1. As a standard rejection of shortcuts or unwanted behavior, the trainer would lift up the ladle cup from the water surface and move it towards the skimmer.All the manta rays were able to correct their angle of approaching towards the ladle cup after rejection(s).
2. Generally, the manta rays are responding to the assigned patterns well and fast over the years which means their visual ability includes recognition of black and white patterns and intepret them as part of cognitive ability.
3. Manta rays are able to gather and associate visual cues for their food-searching behavior, such as the congregation of scats at the surface, ladle cup on the water surface and syringe in the trainer's hand.
4. Manta rays are constantly trying to adapt to each feeding method. They have done shortcuts, display unusual behavior and varying their swimming speed.
5. The manta rays are able to differentiate between each feeding point.
6. There might be a possibility of formed hierarchy and established dominance among manta rays living in the aquarium.
7. Levels of intelligence and adaption ability may vary among individuals.
8. Results show that manta rays have biological clock and uses its cognitive spatial map of its environment for food-searching behavior.
9. Manta rays are highly adaptable to man-made feeding methods compared to its other family members and can be comparable to marine mammals.

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Acknowlegments to the Manta Team, Curatorial Team at SEA Aquarium

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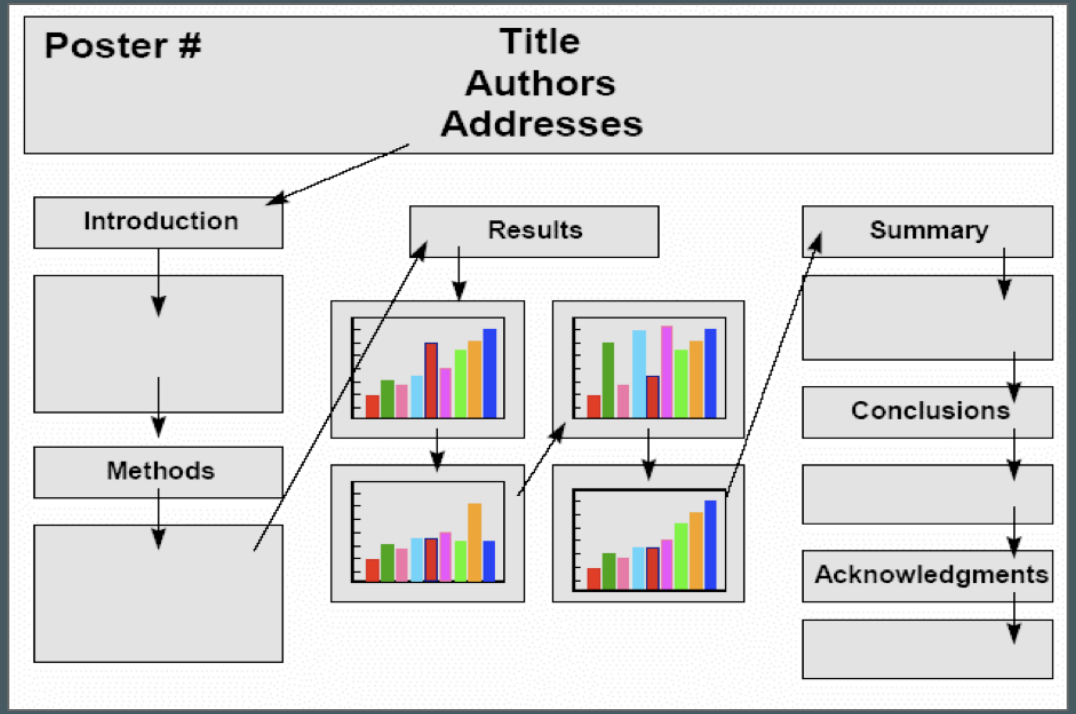

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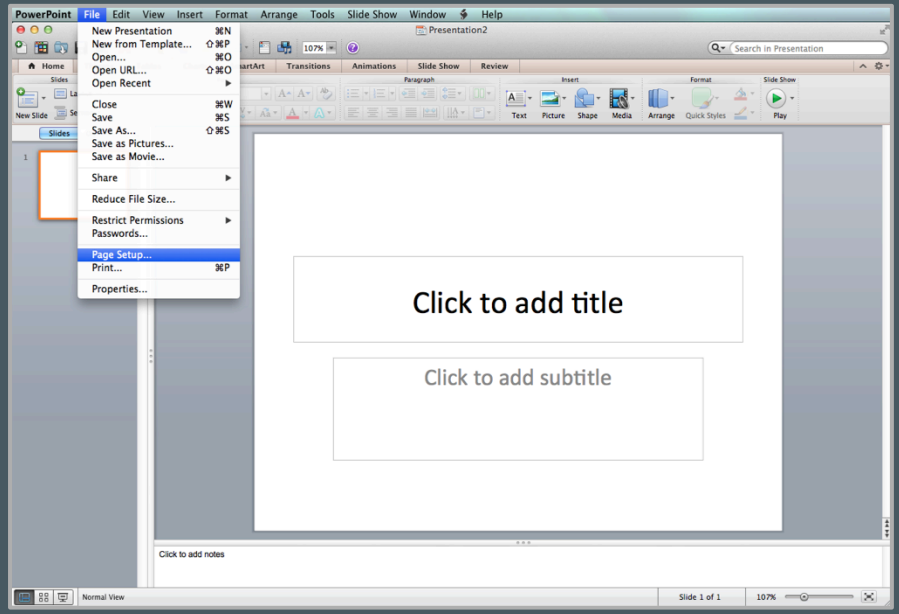

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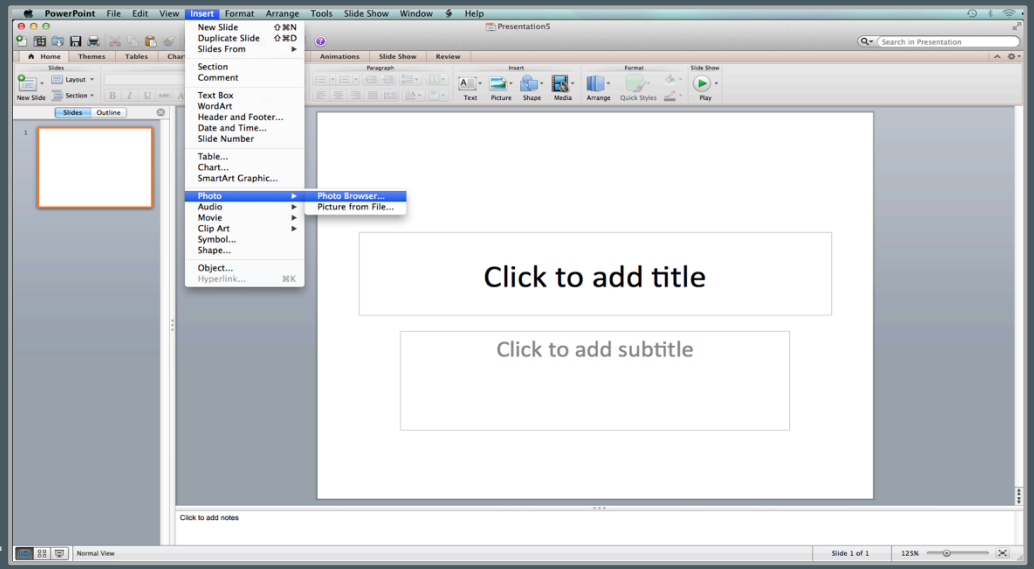

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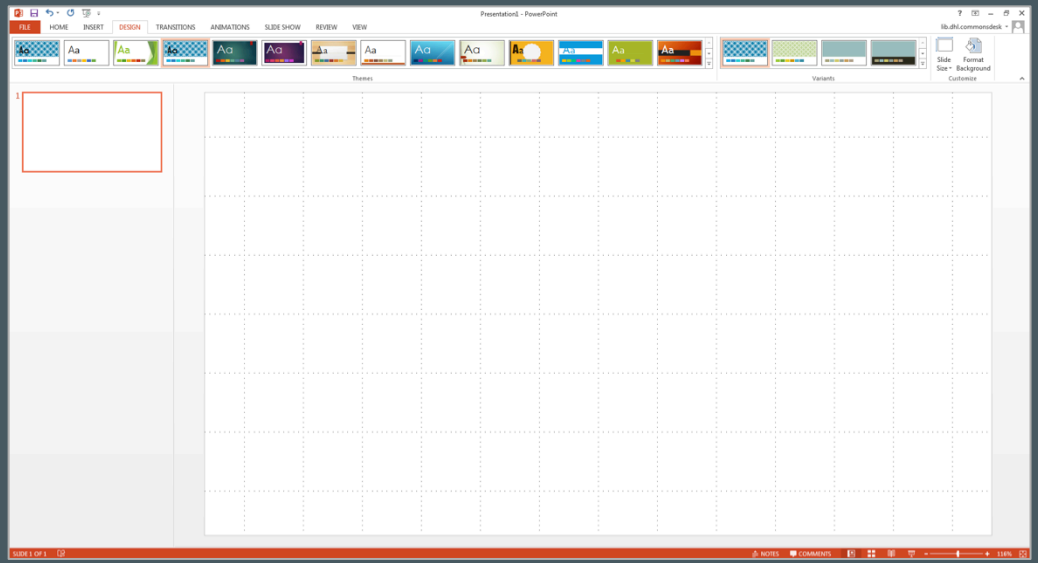

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